

WHAT WE CLAIM IS:

1. A variable valve timing control device comprising:
 - a drive member rotatable in synchronization with a crankshaft;
 - a rotatable driven member connected to a camshaft arranged co-axially with the drive member;
 - a hydraulic chamber formed at one of the drive member and the driven member;
 - a vane dividing the hydraulic chamber into an advanced angle chamber and a retarded angle chamber;
 - a relative rotation phase controlling mechanism which controls a relative rotation phase between the drive member and the driven member between a most retarded angle phase in which a volume of the advanced angle chamber is a maximum and a most advanced angle phase in which a volume of the retarded angle chamber is a maximum by supplying or discharging operation fluid to and/or from the advanced angle chamber and the retarded angle chamber;
 - a lock mechanism which restricts relative rotation between the drive member and the driven member, when the relative rotation phase is a predetermined lock phase between the most advanced angle phase and the most retarded angle phase ;
 - a control mechanism performing an intermediate phase operation upon input of a signal indicating engine stop to position the relative rotation phase intermediate between the most advanced angle phase and the most retarded angle phase by operating the relative rotation phase controlling mechanism, and performing a drain operation to drain the operation fluid from both the advanced angle chamber and the retarded angle chamber after performing the intermediate phase operation.
2. A variable valve timing control device as set forth in Claim 1, wherein upon performing the intermediate phase operation, in the case that the relative rotation phase is positioned in the intermediate phase, upon input of a signal indicating engine stop, a maintaining operation to maintain the relative rotation phase is accomplished and in the case that the relative rotation phase is not positioned in the intermediate phase, upon input of a signal indicating engine stop, a transfer operation to transfer the relative rotation phase to the intermediate phase is accomplished.
3. A variable valve timing control device as set forth in Claim 1, wherein upon

performing the maintain operation, in the case that the engine is not warm the relative rotation phase is maintained until a rotation of the crankshaft is stopped.

4. A variable valve timing control device as set forth in Claim 2, wherein upon performing the transfer operation, the relative rotation phase control mechanism is operated on the basis of a running parameter of the engine upon input of a signal indicating engine stop and the relative rotation phase is transferred to the intermediate phase.

5. A variable valve timing control device as set forth in Claim 3, wherein upon performing the transfer operation, the relative rotation phase control mechanism is operated on the basis of a running parameter of the engine upon input of a signal indicating engine stop and the relative rotation phase is transferred to the intermediate phase.

6. A variable valve timing control device as set forth in Claim 4, wherein upon performing the transfer operation, a control parameter of the relative rotation phase control mechanism relative to a target control amount is determined on the basis of the running parameter of the engine upon input of a signal indicating engine stop.

7. A variable valve timing control device as set forth in Claim 5, wherein upon performing the transfer operation, a control parameter of the relative rotation phase control mechanism relative to a target control amount is determined on the basis of the running parameter of the engine upon input of a signal indicating engine stop.